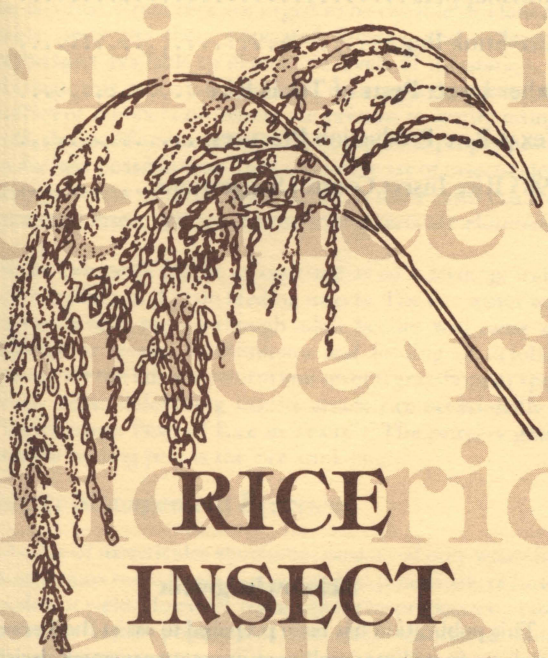
TDOC
ZTA245.7
B873
no. 1445

B-1445



RICE INSECT MANAGEMENT

Texas Agricultural Extension Service, The Texas A&M University System
Zerle L. Carpenter, Director, College Station, Texas

Table of Contents

Acknowledgment

This publication has been prepared to assist the Texas rice producer in making intelligent insect management decisions. The Texas Agricultural Extension Service expresses appreciation to the Texas Rice Producers for their financial support of this publication as one of the programs supported by the Texas Rice Research Foundation. The author recognizes the contributions of Dr. Michael O. Way, Rice and Soybean Research Entomologist (TAEX) at the Beaumont Texas Agricultural Research and Extension Center, in reviewing this manuscript.

Rice Insect Management

*Bastiaan M. Drees**

Many insect species can be found in a rice field, either feeding directly on the rice plants, feeding on associated weeds or merely resting and taking shelter there. Other insects thrive in the aquatic habitat created by permanent flooding. Numerous beneficial insects and spiders are also usually present, feeding on other species. Only a few insects, however, are actually considered as major pests for which the use of insecticides may be justified. Producers are urged to be capable of identifying these pests and their associated damage, and to learn the techniques available to determine levels of infestation. Only through this procedure can farm managers determine when sufficient numbers of insects are present to justify economically the use of an insecticide and to apply the proper pesticide at the best possible time. Indiscriminate use of insecticides not only increases production costs, but in some cases can lead to increased insect damage if beneficial insects are eliminated.

Major rice pests can be categorized as root feeding, leaf and stem feeding, and grain feeding insects. The rice water weevil larvae devour roots although adult beetles will cause some damage to leaves. Predominant leaf feeding or defoliating insects are the fall armyworm and several grasshopper species. Many other defoliating insects attack rice occasionally (see "Other Insect Pests of Rice in Texas"). The primary grain or panicle feeding pest is the rice stink bug.

Insect Management Practices

The use of insecticides should be considered only when insect populations reach levels high enough to potentially reduce rice quality or yield. However, many other rice production practices influence insect populations and their associated damage. Proper managment practices can greatly reduce the number of insecticide applications needed during the production sequence.

Water management is extremely important. Rice has relatively few insect pests, partially because it is usually grown under flooded conditions. Fall armyworm and chinch bug populations could be very damaging in the absence of flooding. Conversely, areas in the field with deep water and thin stands have been observed to harbor the greatest number of rice water weevils.

Planting dates influence rice water weevil larval abundance. Rice planted early (mid-March) in relation to emergence of adults is likely to escape heavy infestation. Early maturing rice may also escape high populations of adult rice stink bugs migragting into rice from declining alternate host plants.

**Extension entomologist, The Texas A&M University System.*

Fertilization practices also affect yield reductions crushed by rice water weevil larval populations. Rice fertilized with optimum rates of nitrogen can tolerate many more larvae without decreasing yields. However, producers should be careful not to over-fertilize those rice varieties which can potentially lodge because of increased panicle weights and vegetative grow

Variety selection is important, not only because of response to nitrogen in relation to larval rice water we damage, but also because certain varieties show some resistance/tolerance to rice water weevil and rice stink bug feeding. Resistance may result from plant characteristics which make certain varieties less attractive to pests than others.

Weed control practices can reduce the number of alternate hosts in a rice field. Rice stink bug populations build up on other grasses in rice fields, in grassy areas around the field margins and in adjoining pastures and sorghum fields.

Disease suppression does not directly affect insect populations. However, when fungicide treatments, fertilizers or herbicides are to be applied, the possibility of tank mixing insecticides should be considered and vice versa. This practice can reduce the number of applications required during the season, but all precautions should be taken to ensure that products are compatible. The chart on page 9 shows the approximate sequence of production practices and their relationships to plant development.

Rice Water Weevil

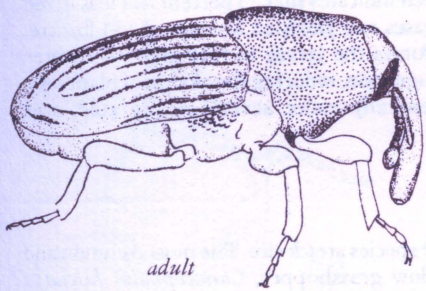
Lissorhoptrus orysophilus Kuschel

Rice plants are injured by adult rice water weevils while fields are being flooded. The 1/8-inch long brownish snout beetles move into rice fields from overwintering habitats and are particularly attracted to areas in the field with deep water and thin plant stands. Adult feeding activity produces characteristic slit-like scars on the leaves as illustrated. Because high numbers of egg laying adult females can result in high larval (root maggot) populations, the decision to treat is based on the appearance of adult feeding scars. Inspect the field 1 week after flooding to determine if an economic infestation is present.

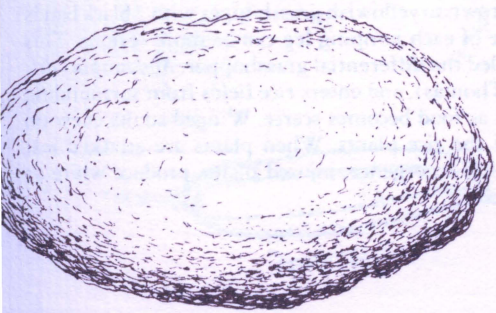
Examine the young terminal leaf (1/2 to 2/3 unfolded and flattened out) on 100 or more plants. If 50 percent or more plants have feeding scars, the field should be treated. Control measures have typically resulted in economic returns where 20 or more larvae per foot of row were present.

The larvae or root maggots feed on the roots of young plants. They are white and nearly 1/3-inch long just prior to pupating inside mud cells attached to the roots. Although the total life cycle is from 35 to 50 days, control is most effective when 3 ...cent carbofuran (Furadan®) granules are aerially applied 7 ...s after flooding at 0.5 lb. active ingredients per acre (16.6 lb. ...adan® 3G). Applications made later are of decreasing value ... permanent damage from root maggots will already have occurred.

rice water weevil

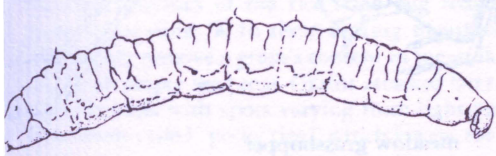


adult



pupal cell

adult feeding damage



larva

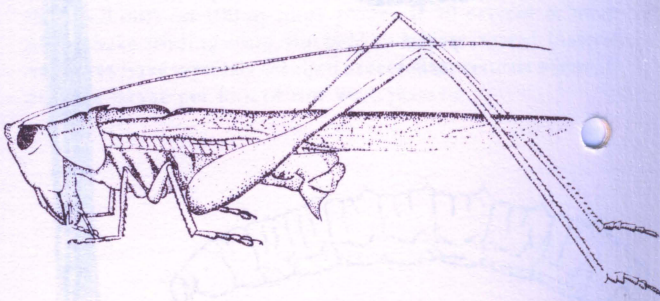
Fall Armyworm

Spodoptera frugiperda (Smith)

All life stages of the fall armyworm are able to survive along the Gulf Coast during winter months, when the larvae fe[illegible] grain crops, grasses and other weeds. During the seedlin[illegible] tillering stages, before flooding, rice can be attacked. Cat[illegible] lars can hatch from egg masses deposited by female mo[illegible] the field or they can immigrate into rice from adjoining areas. These caterpillers are light tan to greenish or brownish and are about 1 1/2-inches long when fully grown. They have 3 yellowish-white hairlike stripes down the back, a conspicuous inverted "Y" on the head and prominent black tubercles on the body from which hairs arise. Small larvae in groups feed down near the ground, especially in the hearts of the plants. Older larvae feed on leaf blades and are capable of severely reducing plant stands. Research indicates that 25 percent leaf loss in the seedling stage decreases rice yields an average of 134 lb/acre. Flooding the field forces the larvae to feed above the water level and restricts migration, reducing the chance of plant loss. Infestations are generally more severe during cold, wet springs.

Grasshoppers

Several grasshopper species attack rice. The most common and abundant is a meadow grasshopper, *Conocephalus fasciatus* (DeGeer). This green insect, 7/8- to 1 1/8-inches long, feeds on leaves and flower parts of rice after fertilization, but causes no appreciable yield losses. A larger (1 1/4- to 1 1/2-inches long) light brown to yellowish grasshopper with 2 black bands on the inside of each jumping leg can be more serious. This species is called the differential grasshopper, *Melanoplus differentialis* (Thomas), and enters rice fields from surrounding pasturelands as food becomes scarce. Winged adults chew on the stems of the rice plants. When plants are attacked just prior to panicle emergence, injured plants produce white or "blasted" heads.

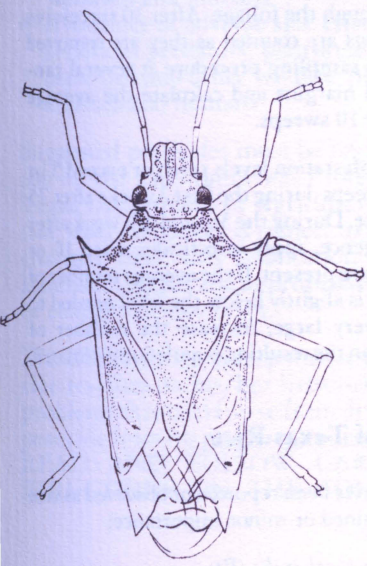


meadow grasshopper

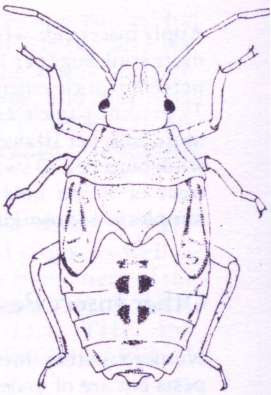
Rice Stink Bug
Oebalus pugnax (Fabr.)

Adult rice stink bugs overwinter near the ground surface in [illegible] grasses, particularly in the absence of severely cold [illegible]ers. In spring the straw-colored 3/8- to 1/2-inch long [illegible]s emerge and deposit egg clusters containing 10 to 47 c[illegible]drical eggs on blades of grasses in the process of producing seed. Nymphs hatching from these eggs are initially bright red with black markings, but as they grow they become tan colored with an intricate red and black pattern on their abdomens.

rice stink bug



adult



nymph

"pecky" rice

Nymphs neither have the wings nor the forward-pointed spines behind their heads. As rice panicles emerge, rice stink bug nymphs and the very mobile adults migrate from their alternate host plants into the field, and are generally much m[illegible] abundant along field margins.

Feeding activities of the rice stink bug reduce quality and quantity of yield. With their sucking mouthparts, they can completely remove a grain's content in the milk stage, resulting in an empty seed coat. Grains attacked later become shriveled kernels with spots varying from light yellow to black, commonly called "pecky rice," which lowers the market value of the rice.

A standard 15-inch diameter insect sweepnet is used to determine rice stink bug population levels. This tool can be m[illegible] home or ordered from entomological supply outlets (co[illegible]t your Extension entomologist for instructions or su[illegible] addresses). When 75 percent of the panicles have eme[illegible], fields should be scouted at weekly or bi-weekly intervals until harvest. A sampling unit of 10 consecutive (180°) sweeps while walking through the field has proven to be an effective sampling method. The net is swung from side to side with each step. The net should be held so the lower half of the opening (7 to 8 inches) is drawn through the foliage. After 10 successive sweeps, the rice stink bugs are counted as they are removed from the net. Repeat the sampling procedure at several random sites, avoiding field margins and calculate the average number of stink bugs per 10 sweeps.

Apply insecticide when infestation levels reach or exceed 5 or more stink bugs per 10 sweeps during the first 2 weeks after 75 percent panicle emergence. During the 3rd and 4th week after 75 percent panicle emergence, apply insecticides when 10 or more bugs per 10 sweeps are present. If the average number of stink bugs per 10 sweeps is slightly below the level needed to treat or if the field is very large, increase the number of samples to add confidence in the resulting population estimates.

Other Insect Pests of Texas Rice

Numerous other insects have been reported or observed as rice pests but are of undetermined or minor importance:

Sugarcane borer, *Diatraea saccharalis* (F)
Rice stalk borer, *Chilo plejadellus* Zincken
Sugarcane beetle, *Eutheola rugiceps* (LeConte)
Chinch bug, *Blissus leucopterus* (Say)
Flea Beetle, *Systena frontalis* Fabricius
Billbug, *Sphenophorus oblitus* LeConte
Southern corn rootworm, *Diabrotica undecimpuntata* Barber
Hemipteron, *Paromius longulus*
Hemipteron, *Leptocorixa tipuloides* DeGeer
Leafhopper, *Draeculacephala portola* Ball
Leafroller, *Hylephila phyleus* Drury
Spider mite, *Schizotetranychus oryzae*
Thrips, species undetermined
Leafroller, *Ancyloxrpha numitor* Flanders

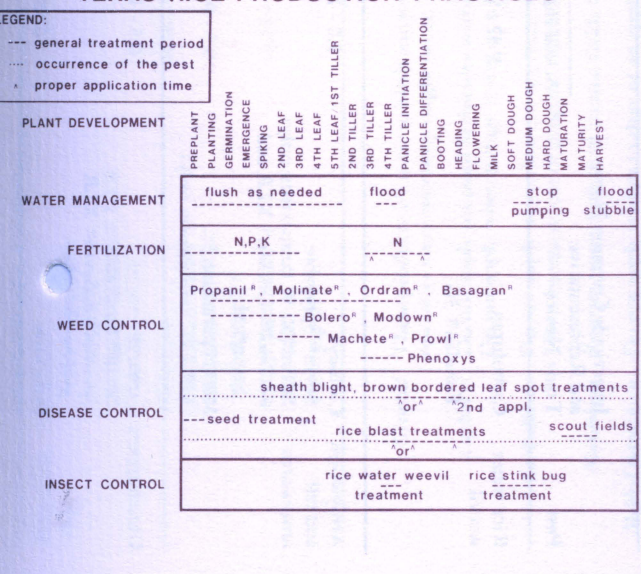
Recommendations on pesticide use made by the Texas Agricultural Extension Service and the Texas Agricultural Experiment Station are based upon:

- Effectiveness under Texas conditions
- Avoidance of residues in excess of allowable tolerances
- Avoidance of toxicity to desirable vegetation, animals and humans
- Avoidance of adverse side effects upon beneficial predators, parasites, honey bees, fish and other wildlife, plants, animals and humans

Suggested pesticides must be registered and labeled for use by the Environmental Protection Agency and the Texas Department of Agriculture. The status of pesticide label clearances is subject to change, and may have changed since this publication was printed. County Extension agents and appropriate specialists are advised of changes as they occur.

The USER always is responsible for the effects of pesticide residues on his/her livestock and crops, as well as problems that could arise from drift or movement of the pesticide from his property to that of others. ALWAYS READ AND FOLLOW CAREFULLY THE INSTRUCTIONS ON THE CONTAINER LABEL.

TEXAS RICE PRODUCTION PRACTICES



Pest	Insecticide Common Name and Representative Trade Names	Rate/Acre: Actual Ingredients	Rate/Acre: Pesticide Formulation	Waiting Period Until Harvest	Remarks
Rice water weevil	Carbofuran	0.45 - 0.6 lbs.		60	Apply aerially 7 days after permanent flood when 50% or more of the unfolding youngest leaves of plants inspected are found to have adult feeding scars. Hold flood at least 1 week after application. See restrictions.
	Furadan® 3G		15 - 20		
Armyworm and fall armyworm	Carbaryl	1.0 - 1.5 lb.		14	Prior to flooding, apply insecticide when excessive leaf loss occurs in the seedling stage. Repeat carbaryl applications at 7 to 14 day intervals to maintain control or until flooding. Use the highest suggested rate when caterpillars are large.
	Sevin® Sprayable		1 1/4 - 1 7/8 lb.		
	Sevin® 50-W (armyworm only)		2 - 3 lb.		
	Sevimol® 4, Sevin® XLR and Sevin® SL		1/4 - 1/3 gal.		
	Methyl parathion	0.5 - 0.75 lb.		15	
	MP 4 EC (armyworm only)		1 - 1 1/2 pt.		See restrictions.
Grasshoppers	Carbaryl	0.5 - 1.5 lb.		14	Use lower suggested rates for nymphs on small plants or sparse vegetation. Use higher suggested rates for adults. Apply for differential grasshopper when stem damage is evident [illegible] during panicle emergence.
	Sevin® Sprayable		2/3 - 1 7/8 gal.		
	Sevimol® 4, Sevin® XLR and Sevin® SL		1/8 - 1/3 gal.		
	Malathion	0.58 lb.		7	
	Malathion ULV (Cythion®)		8 fl. oz.		

Rice stink bug	Carbaryl	1.0 - 1.5 lb.		14	Check infestation levels we[illegible]veekly following 75% panicle emer[illegible]ce [illegible]ng a 15-inch diameter sweep net. Apply an insecticide when 5 or more stink bugs per 10 sweeps are present during the first two weeks after fields initially reach 75% panicle emergence, or when more than 10 stink bugs per 10 sweeps are present thereafter. Repeat treatment as necessary to maintain control. Apply Malathion ULV for stink bug control by air only.
	Sevin® Spra[illegible]ble		1 1/4 - 1 7/8 lb.		
	Sevin® 50-W		2 - 3		
	Sevimol® 4, Sevin® XLR and Sevin® SL		1/4 - 1/3 gal.		
	Malathion	0.58 - 0.94 lb.		7	
	Malathion ULV®		8 fl. oz.		
	Malathion 57% EC		1 - 1 1/2 pt.		
	Malathion E-8		10 - 15 oz.		
	Methyl parathion	0.25 - 0.5 lb.		15	
	MP 4 EC		1/2 - 1 pt.		
	Penncap-M®		1 - 2 pt.		See restrictions.

Restrictions:

General These products are toxic to birds and wildlife. Do not apply or allow these pesticides to drift into areas where crabs, shrimp or crayfish are important resources since mortality might occur. Prevent runoff from contaminating lakes and streams since these products are toxic to fish.

Carbaryl Do not apply propanil herbicides within 15 days of carbaryl application or plant injury will likely occur. Do not apply when foliage is wet or when rain or excessive humidity is expected.

Carbofuran Do not apply more than one application per season. The subsequent use of propanil herbicides may result in tip burn.

Malathion Restrict water spill from treated fields for 48 hours following application since this product is toxic to fish.

Methyl parathion Do not apply within 14 days of an application or propanil herbicides.

The informatiion given herein is for educational purposes only. Reference to commerical products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.

Educational programs conducted by the Texas Agricultural Extension Service serve people of all ages regardless of socioeconomic level, race, color, sex, religion, handicap or national origin

---

Cooperative Extension Work in Agriculture and Home Economics, The Texas A&M University System and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.
5M—2-83 ENTO